इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 3936 (1966): Porcelain mortars and pestles [CHD 10: Glassware]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 3936 - 1966

(Reaffirmed 2002)

Indian Standard

SPECIFICATION FOR PORCELAIN MORTARS AND PESTLES

(First Reprint AUGUST 1983)

UDC 542·232

© *Copyright* 1967

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3

March 1967

Indian Standard

SPECIFICATION FOR PORCELAIN MORTARS AND PESTLES

Ceramicware Sectional Committee, CDC 27

Chairman	*Representing*
Dr Atma Ram	Central Glass and Ceramic Research Institute (CSIR), Calcutta
Members	
Shri R. V. Lele (*Alternate* to Dr Atma Ram)	
Shri G. K. Bhagat	Bengal Potteries Ltd, Calcutta
Chairman	Canteen Stores Department (India), Bombay
Chief Purchase Officer (*Alternate*)	
Shri S. Deb (Junior)	Bengal Porcelain Co Private Ltd, Calcutta
Dr U. P. Ganguli	Vitreous Enamellers' Association, Calcutta
Shri A. Banerjee (*Alternate*)	
Shri M. K. Ganpule	The Parshuram Pottery Works Co Ltd, Wankaner
Shri A. K. Ganpule (*Alternate*)	
Shri S. C. Ghosh	All India Pottery Manufacturers' Association, Belgharia
Shri L. R. Bhagat (*Alternate*)	
Shri N. C. Gupta	Federation of Hotel and Restaurant Associations of India, New Delhi
Dr M. V. N. Murthy	Geological Survey of India, Calcutta
Shri D. P. Niyogi	Sur Enamel and Stamping Works Private Ltd, Calcutta
Shri Shisir Kumar Sur (*Alternate*)	
Shri M. G. Pandit	Directorate General of Health Services (Ministry of Health)
Shri K. Gangayya (*Alternate*)	
Shri K. H. Parikh	Government of Uttar Pradesh
Shri T. C. K. Pillai	Kerala Ceramics Ltd, Kundara
Shri E. K. Ramachandran	National Test House, Calcutta
Shri K. L. Banerjee (*Alternate*)	
Shri S. Ray	Government of West Bengal
Shri J. Sanyal (*Alternate*)	
Shri D. Sarkar	Ministry of Railways
Dr H. A. Shah	Development Commissioner, Small Scale Industries (Ministry of Industry & Supply)
Shri N. R. Srinivasan	Directorate General of Technical Development (Ministry of Industry & Supply)
Shri K. L. Talwar	Ministry of Defence (DGI)
Shri A. P. Agarwal (*Alternate*)	

(*Continued on page* 2)

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI

(*Continued from page* 1)

Members	*Representing*
Shri Bhaskar Ullal	E. I. D. — Parry Ltd, Ranipet
Shri N. G. Bowen (*Alternate*)	
Dr Sadgopal, Director (Chem)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri S. K. Karmakar
Deputy Director (Chem), ISI

Panel for Laboratory and Hospital Porcelain, CDC 27 : P3

Convener	
Shri S. Deb (Junior)	Bengal Porcelain Co Private Ltd, Calcutta
Members	
Shri R. V. Lele	Central Glass and Ceramic Research Institute (CSIR), Calcutta
Dr Bhan Bhusan (*Alternate*)	
Shri M. G. Pandit	Directorate General of Health Services (Ministry of Health)
Shri K. Gangayya (*Alternate*)	
Shri K. L. Talwar	Ministry of Defence (DGI)

Indian Standard

SPECIFICATION FOR PORCELAIN MORTARS AND PESTLES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 9 August 1966, after the draft finalized by the Ceramicware Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard covers porcelain mortars and pestles used widely for general analytical, pharmaceutical, dental and similar purposes. It is hoped that this standard will fulfil a long felt need for rationalizing the production of standard types of porcelain mortars and pestles and will also help consumers to select products of acceptable quality.

0.3 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in this country. This has been met by deriving assistance from DIN 12906 'Mortar and pestle' issued by Deutscher Normenausschuss, and Federal Specification No. NNN-M-560-1962 'Mortar and pestle' issued by the Federal Supply Service, USA.

0.4 This standard is one of a series of Indian Standards on porcelain laboratoryware. Other standards published so far are:

IS : 2836-1964 Methods of test for laboratory porcelain
IS : 2837-1964 Specification for porcelain crucible and basin
IS : 3432-1965 Specification for clay pipe triangle
IS : 3953-1966 Specification for high temperature combustion boat (*under print*)
IS : 3990-1967 Specification for combustion tube (*under print*)

0.5 This standard contains clauses **3.1** and **6.1** which permits the purchaser to use his option for selection to suit his requirement.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of test and sampling for porcelain mortars and pestles.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2781-1964* shall apply.

3. TYPES

3.1 There shall be two types of mortar and pestle as follows:

a) Type 1 (GP) — Glazed outside, with porcelain pestle, and
b) Type 2 (UW) — Unglazed, with wooden handle for the pestle.

NOTE — The purchaser may use his option while ordering pestle with wooden handle with Type 1 mortar and *vice-versa.*

4. REQUIREMENTS

4.1 Material

4.1.1 *Porcelain* — The mortar and pestle shall be made of dense, homogeneous, porcelain body having high mechanical and abrasion resistance. It shall be resistant to all chemicals except hydrofluoric acid and strong alkalis.

4.1.2 *Timber* — Any of the timber species recommended in Appendix A shall be used in the manufacture of the handle of the type 2 pestle.

4.1.2.1 The pestle handle shall be made of straight grained, sound, thoroughly seasoned timber free from brashness, sap, knots and other imperfections.

4.2 Construction

4.2.1 *Mortar* — The mortar shall have the proper inside curvature to facilitate grinding with sufficiently thick walls to withstand the usage for which they are intended. The base shall be slightly concaved and of a suitable diameter to give a firm and stable resting surface. The lip shall be of suitable design so that, while pouring, the liquid does not cling to the outside of the mortar.

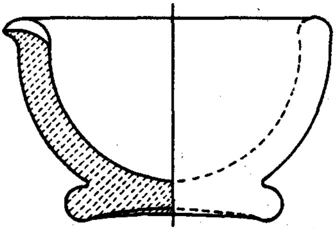
4.2.2 *Pestle* — The pestle shall afford a comfortable manual grip. The grinding end shall be properly rounded to facilitate grinding.

---

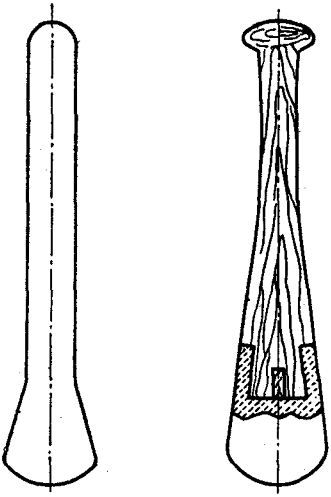
*Glossary of terms relating to ceramicware.

4.2.2.1 The handle for Type 2 pestle shall be made of wood (**4.1.2**). The handle shall be properly secured to the grinding head and strong enough to withstand the handling encountered in the normal usage.

4.3 Shape — The mortars and pestles shall generally conform to the shape shown in Fig. 1.



1A MORTAR



TYPE 1 TYPE 2

1B PESTLES

Fig. 1 Typical Mortar and Pestles

4.4 Capacities and Dimensions

4.4.1 The mortar and pestle shall conform to the dimensions as given in Table 1 for respective nominal capacities.

TABLE 1 DIMENSIONS FOR MORTARS AND PESTLES

(*Clause* 4.4.1)

SL No.	NOMINAL CAPACITY	MORTAR			PESTLE	
		Top Outside Diameter	Top Inside Diameter	Height	Overall Length	Diameter of Grinding End
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ml	mm	mm	mm	mm	mm
Type 1 Mortar and Pestle						
i)	50	70	50	40	100	15
ii)	100	80	60	50	130	17
iii)	150	90	70	60	130	19·5
iv)	250	110	85	70	160	22·5
v)	400	130	100	80	180	25
vi)	750	160	130	100	250	28
vii)	2 000	210	180	130	250	36
viii)	4 000	285	245	150	250	57
Type 2 Mortar and Pestle						
i)	50	80	60	55	130	17
ii)	100	90	70	55	130	19·5
iii)	150	100	80	65	150	22·5
iv)	300	130	100	70	180	25
v)	450	140	110	90	180	26
vi)	750	160	130	100	200	27
vii)	1 200	190	160	100	250	32
viii)	1 650	200	170	120	250	34
ix)	3 000	250	215	130	300	47·5
x)	5 000	300	260	150	300	62

4.4.1.1 A tolerance of 5 percent on the height and top diameter of the mortar and overall length and diameter of the head of the pestle shall be allowed.

4.5 Finish

4.5.1 For Type 1 mortar and pestle, the outside of the mortar except the base, and the outside of the pestle approximately 25 mm above the grinding end shall have a smooth glaze. The unglazed surfaces shall be finished smooth.

4.5.2 For Type 2 mortar and pestle, all porcelain surfaces shall be unglazed and have a smooth finish.

4.5.2.1 The handle of the pestles for Type 2 shall have natural wood finish.

4.6 Workmanship

4.6.1 Mortars and pestles shall be free from cracks, specks, and other defects.

4.7 The material shall also pass appropriate tests as prescribed in **8.1** and **8.2**.

4.8 Porosity — The water absorption of the porcelain body shall be not more than 0·5 percent when tested in accordance with the method prescribed in Appendix B.

5. MARKING

5.1 Each mortar shall be permanently and legibly marked on the outside with the following:

a) Type of mortar,
b) Capacity, and
c) Name or trade-mark of the manufacturer.

5.1.1 The mortar and pestle may also be marked with the ISI Certification Mark.

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. PACKING

6.1 Mortars and pestles shall be suitably packed in wooden crates, cardboard boxes or in any suitable containers, as agreed to between the purchaser and the supplier.

7. SAMPLING

7.1 The procedure for sampling and criteria for conformity of porcelain mortars and pestles shall be as given in Appendix C.

8. TEST METHODS

8.1 Thermal Shock Test — Immerse the mortar completely in a waterbath maintained at a temperature of 70° ± 2°C above that of the tap water and leave submerged for a period of T minutes where T is equal to $15 + 0{\cdot}7 \times$ mass of the mortar in kg. Withdraw it quickly and immerse completely in a bath of tap water for a period of T minutes. The time taken to transfer the mortar from the hot bath to tap water bath shall be as short as possible but shall not exceed 30 seconds.

8.1.1 Repeat the cycle of heating and cooling 5 times.

8.1.2 The body shall not crack and the glaze, in case of glazed mortars, shall not show any crazing.

8.2 Boiling Test — This test is applicable only to pestles with wooden handles. Immerse the pestle completely in distilled water in a closed vessel having a small steam vent and boil for 1 hour, adding boiling distilled water when necessary to compensate for evaporation losses. The wooden handle and the porcelain head when pulled apart manually shall not show any loosening of the union between the two.

APPENDIX A

(*Clause* 4.1.2)

SPECIES OF TIMBER FOR MANUFACTURE OF WOODEN PORTION OF THE PESTLE

TRADE NAME		BOTANICAL ORIGIN
Roman	*Devnagri*	
laurel (asan)	असना	*Terminalia tomentosa* W. & A., fam. Combretaceae
babul	बबूल	*Acacia arabica* Willd., fam. Leguminosae
Black Chuglam	काला चुगलम	*Terminalia manii* king., fam. Combretaceae
axle wood (dhaura)	धौरा	*Anogeissus latifolia*, Wall., fam. Combretaceae
ebony	आबनूस	i) *Diospyros koening* syn. *Diospyros assimilis* Bedd., *Diospyros sapota* Roxb., fam. Ebenaceae ii) *Diospyros tomentosa* Roxb., fam. Ebenaceae iii) *Diospyros melanoxylon* Roxb., syn. *Diospyros tupsu* Buch.-Ham., fam. Ebenaceae

TRADE NAME		BOTANICAL ORIGIN
Roman	*Devnagri*	
hopea	कल्होनी	*Hopea parviflora* Bedd., fam. Dipterocarpaceae
kalasiris	काला सिरिस	*Albizzia odoratissima* Benth., fam. Leguminosae
kardahi	करदाही	*Anogeissus pendula* Edgew, fam. Combretaceae
khair	खैर, कत्था	*Acacia catechu* Willd., fam. Leguminosae
bulletwood (maulsari)	मौलश्री	*Mimusops elengi* Linn., fam. Sapotaceae
yon (pasi)	पासी	*Anogeissus acuminata* Wall., fam. Combretaceae
sal	साल	*Shorea robusta* Gaertn., fam. Dipterocar Paceae
sandan	तिसा	*Ougenia dalbergioides* Benth., fam. Leguminosae
sissoo	शीशम	*Dalbergia sissoo* Roxb., fam. Leguminosae
sundri	सुन्दरी	*Heritiera minor*. syn. *Heritiera fomes* Buch-Ham., fam. Sterculiaceae
teak	सागौन	*Tectona grandis* Linn., fam. Verbenaceae

APPENDIX B

(*Clause* 4.8)

TEST FOR POROSITY

B-0. PRINCIPLE

B-0.1 Porosity of the material is determined by the amount of water absorbed.

B-1. TEST PIECES

B-1.1 Six test pieces, each having a surface area of about 50 cm^2 shall be broken from widely separated parts of three or more articles. The two major surfaces shall be glazed surfaces only in the case of Type 1 and any other surface shall be unglazed and freshly broken. Care should be taken not to produce cracks in the body or in the glaze; any such pieces may be discarded. Alternatively, test pieces may be separately made using the same body and glaze materials as used in the making of the wares of the batch and put through the kiln alongwith the wares.

B-2. PROCEDURE

B-2.1 Dry the test pieces to a constant weight at a temperature between 110° and 115°C and then cool to room temperature in a desiccator. Weigh the pieces to an accuracy of not less than 0·01 g and place in a vessel from which the air can be removed maintaining the pressure at less than 3 cm of mercury for 1 hour. Admit cold freshly-boiled distilled water into the vessel without reducing the vacuum until the pieces are covered. Then admit air into the vessel without removing the pieces and boil in distilled water for not less than 20 minutes. Cool and wipe the pieces with a damp smooth cloth in such a manner as to remove the surface water only and then weigh quickly.

B-3. CALCULATION

B-3.1 Water absorption of the test pieces shall be calculated as follows:

$$\text{Percentage water absorption} = \frac{W_2 - W_1}{W_1} \times 100$$

where

W_2 = weight of test pieces after treatment, and

W_1 = weight of the dry test piece.

B-3.1.1 Each of the six test pieces shall show a water absorption not more than 0·5 percent.

APPENDIX C

(*Clause* 7.1)

SAMPLING OF MORTARS AND PESTLES

C-1. SCALE OF SAMPLING

C-1.1 Lot — All the articles of the same type, capacity and produced under essentially similar conditions of manufacture and offered for inspection at the same time shall be grouped together to constitute a lot.

C-1.2 The conformity of the lot to the requirements of this specification shall be ascertained separately for each individual lot. The number of articles to be selected for this purpose shall depend on the size of the lot and col 1 and 2 of Table 2.

TABLE 2 NUMBER OF SAMPLES

(*Clause* C-1.2)

NUMBER OF ARTICLES IN THE LOT (N) (1)	NUMBER OF ARTICLES IN THE SAMPLE (n) (2)	PERMISSIBLE NUMBER OF DEFECTIVE ARTICLES (*Clause* **C-2.1**) (3)	NUMBER OF ARTICLES TO BE TESTED FOR **8.1** and **8.2** (4)
Up to 50	8	0	2
51 ,, 100	13	1	3
101 ,, 500	20	2	5
501 ,, 3 000	32	3	8
3 001 and above	50	5	13

C-1.3 The samples shall be selected at random from the lot. To ensure randomness of selection use shall be made of random number tables. If such a table is not available the following procedure shall be adopted:

> Starting from any article in the lot count them in one order as 1, 2, 3,..........., up to r and so on, where r is the integral part of N/n (N being the number of articles in the lot and n the number of articles in the sample). Every rth article thus counted shall be withdrawn to constitute the sample.

C-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

C-2.1 Each of the articles in the sample selected in **C-1.2** and **C-1.3** shall be inspected for all the requirements other than those specified in **8.1** and **8.2**. An article failing to meet any one or more of the requirements tested shall be called a defective article. The lot shall be considered as conforming to these requirements and subjected to next stage of testing according to **C-2.2**, if the number of defective articles in the sample does not exceed the number given in col 3 of Table 2.

C-2.2 For each of the tests in **8.1** and **8.2** the number of articles to be tested shall be as indicated in col 4 of Table 2. These articles shall be chosen at random from those already selected. The lot shall be considered as conforming to these requirements and subjected to final stage of testing according to **C-2.3**. If one or more of the articles fail in any one or more of the tests, the lot shall be declared as not conforming to the requirements of this specification.

C-2.3 After the lot has been found satisfactory in **C-2.1** and **C-2.2**, six articles shall be chosen at random from the articles in the selected sample remaining after the required number of articles has been taken for the tests in **8.1** and **8.2**. These six test pieces shall be taken from at least three of the articles selected in **C-2.2** and subjected to test for porosity according to Appendix B. The lot shall be considered to satisfy the requirements of porosity if all the six test pieces pass this test.

C-2.4 The lot shall be declared to satisfy all the requirements of this specification, if it passes in **C-2.1**, **C-2.2** and **C-2.3**.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 $kg.m/s^2$
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones : 26 60 21, 27 01 31 Telegrams : Manaksanstha

Regional Offices:

			Telephone
Western	: Novelty Chambers, Grant Road	BOMBAY 400007	89 65 28
Eastern	: 5 Chowringhee Approach	CALCUTTA 700072	27 50 90
Southern	: C. I. T. Campus	MADRAS 600113	41 24 42
Northern	: B69, Phase VII	S.A.S. NAGAR (MOHALI) 160051	8 78 26

Branch Offices:

'Pushpak' Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	22 48 05
Gangotri Complex, Bhadbhada Road, T.T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
5-8-56C L.N. Gupta Marg	HYDERABAD 500001	22 10 83
R 14 Yudhister Marg, C Scheme	JAIPUR 302005	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	4 72 92
Patliputra Industrial Estate	PATNA 800013	6 28 98
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at Seema Offset Press, Delhi, India